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Veröffentlichungsversion / Published Version
Arbeitspapier / working paper

Institut für Ost- und Südosteuropaforschung
Institute for East and Southeast European Studies

Policy Issues

No. 11 March 2016

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Institutions and labour market outcomes in the EU – A Social Model Employment Efficiency and Income Distribution Index

Michael Knogler and Fidelis Lankes

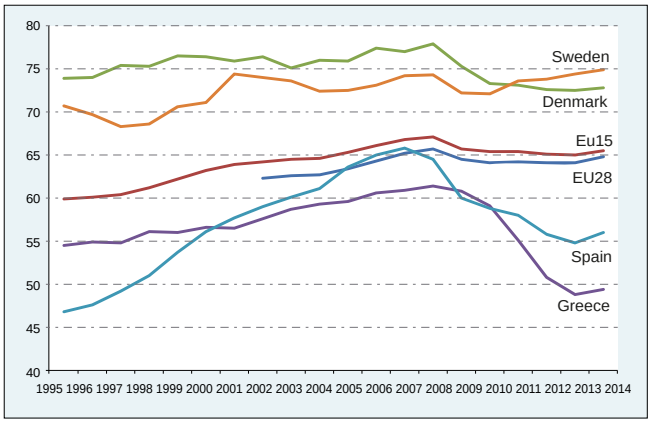
Labour market performance as measured by employment rates and inequality of income distribution show significant differences among EU countries. In 2014 the variation in employment rates was between 48.8% in Greece and 74.4% in Sweden. Inequality in income distribution as measured by S80/S20 income quintile share ratio ranges in 2013 from 3.4 in Czech Republic to 6.6 in Bulgaria, Romania and Greece and has risen especially in Southeast European countries during the last years. To some extent, labour market and social institutions may account for these differences. Implemented social models in Europe differ from each other by different combinations of policies and institutions showing the dimensions of social models. We use these dimensions to develop two indices which capture the employment and income distribution efficiency of social models i.e. shows how institutions impact on employment and income distribution. Both indices can be used to rank and compare the institutional quality of social models across EU countries.

Employment and income distribution patterns and Institutions

Despite some progress during the second half of the 1990s and the first half of 2000s, labour market performance in the EU has been rather week. Employment rates admittedly rose and unemployment rates sunk till 2008, but during the crisis period beginning with 2008, unemployment rate in the EU sharply rose and was at 10.4% in 2014. Employment rates are at 64.8% in the EU28 and below the Lisbon goal (70 percent) (European Commission, 2014).

However, the overall trends in the EU conceal significant differences in labour market outcomes among EU Countries. Although employment rates in most countries are recently (2014) higher than 1995, the difference in employment rates between the country with the highest employment rate and the country with the lowest employment was largely constant with more than 27 percentage points in 1995 (Denmark: 73.9; Spain: 46.8) and almost 26 percentage points in 2014 when the variation was between 48.8% in Greece and 74.4% in Sweden (Figure 1).

Figure 1: Employment rate, 1995–2014

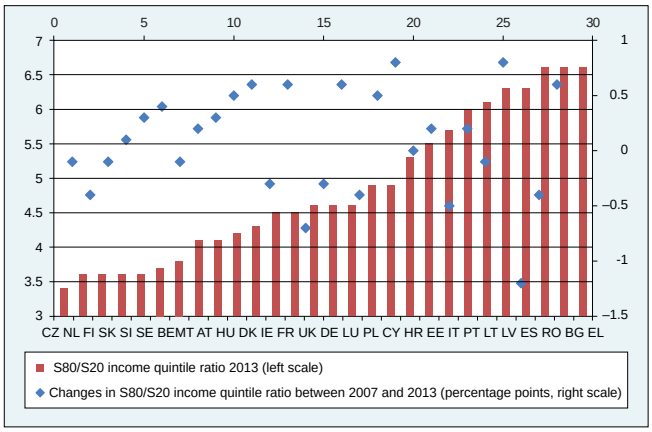


Source: Eurostat.

The low employment and growth performance over the recent decades in the EU has increased concerns regarding an increasing wage dispersion, income inequality and social exclusion. Different indicators show evi-

dence that income inequality has increased significantly since the mid-1980s, and the Euro area debt crisis together with fiscal consolidation programmes adopted by several EU countries could worsen the situation in the short and medium run. Inequality in income distribution as measured by S80/S20 income quintile share ratio ranges in 2013 from 3.4 in Czech Republic to 6.6 in Bulgaria, Romania and Greece and has risen especially in Southeast European countries during the last years (Figure 2).

Figure 2: Income inequality. S80/S20 income quintile ratio* 2007/2013



* The ratio of total income received by the 20% of the population with the highest income (top quintile) to that received by the 20% of the population with the lowest income (lowest quintile). Income must be understood as equivalised disposable income.

Source: Eurostat.

To some extent labour market institutions may account for these differences. There is a long-standing literature relating labour market outcomes to labour market institutions (for a broad review of the literature see Boeri and Van Ours (2008), brief summaries in Layard, Nickell and Jackman (2005, p. XIII–XXXIX) and Blanchard (2006), among others). Most researchers have focused on the relationship between institutions and unemployment. Some authors have also reported evidence on the link between institutions and employment (see Nickell (1997) and EU Commission (2004), and Bassanini and Duval (2006), among others). More recently, the focus of labour economists has shifted to interactions between different labour market institutions (Coe and Snower, 1997, Belot and van Ours 2001, Bassanini and Duval 2009). Labour market institutions have complementary effects on labour market outcomes, which are indicative for broad reform packages, rather than changes in a single institutional variable. Interactions between institutions triggered the analysis of economic systems or social models, which can be identified to prevailing combinations of policies and institutions across countries (Knogler and Lankes, 2012).

Data and Methodology

The central idea of the indices is to assess the extent to which European countries dispose of the institutional quality to achieve high levels of employment and social cohesion. Labour market and social policy institutions can be described by a potentially vast number of empirical indicators. The guiding principle for our selection of indicators is the hypothesis that social models reflect the main tasks of labour and social policy to varying degrees, that is, reduction of poverty and income inequalities, protection against insurable labour market risk, and increase of rewards from labour market participation (Boeri, 2002). In detail, eleven indicators which are essentially exogenous to the economic outcome (employment rates, income inequality etc.) were included. All these indicators taken mostly from Eurostat and World-Bank sources characterize policy or institutional features chosen in order to reflect the main tasks of social and labour market policy (table 1).

Table 1: Social policy indicators

Indicator	Description and Source
Mean years of schooling (males aged 25 years and above) (years)	Average number of years of education received by people ages 25 and older, converted from education attainment levels using official durations of each level. Source: Barro and Lee (2013), UNESCO Institute for Statistics (2013b) and HDRO estimates based on data on educational attainment from UNESCO Institute for Statistics (2013b) and on methodology from Barro and Lee (2013). http://hdr.undp.org/en/content/mean-years-schooling-males-aged-25-years-and-above-years
Reduction of poverty via social transfers	Quotient of: (i) The share of persons with an equivalised disposable income, before social transfers, below the risk-of-poverty threshold, which is set at 60% of the national median equivalised disposable income (after social transfers). Retirement and survivor's pensions are counted as income before transfers and not as social transfers. (ii) The share of persons with an equivalised disposable income below the risk-of-poverty threshold, which is set at 60% of the national median equivalised disposable income (after social transfers). Source: Eurostat.
Early leavers from education and training	This indicator refers to persons aged 18 to 24 fulfilling the following two conditions: first, the highest level of education or training attained is ISCED 0, 1, 2 or 3c short, second, respondents declared not having received any education or training in the four weeks preceding the survey (numerator). The denominator consists of the total population of the same age group, excluding no answers to the questions “highest level of education or training attained” and “participation to education and training”. Both the numerators and the denominators come from the EU Labour Force Survey. Source: Eurostat.
Hiring and firing practises	In your country, how would you characterize the hiring and firing of workers? [1 = heavily impeded by regulations; 7 = extremely flexible] Source: Global competitiveness Report, World Economic Forum, Executive Opinion Survey.
Generosity of unemployment benefits	Expenditures on passive labour market policy (Category 8 and 9: financial assistance that aims to compensate individuals for loss of wage or salary and support them during job-search (i.e. mostly unemployment benefits) or which facilitates early retirement.) weighted with unemployment ratio. Source: Eurostat; Own calculations.
Expenditures on active labour market policy	Expenditures on active labour market policy (Category 2–7: interventions that provide temporary support for groups that are disadvantaged in the labour market and which aim at activating the unemployed, helping people move from involuntary inactivity into employment, or maintaining the jobs of persons threatened by unemployment) weighted with unemployment ratio. Source: Eurostat; Own Calculations.
Life-long learning	Percentage of the adult population aged 25 to 64 participating in education and training: Life-long learning refers to persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the survey (numerator). The denominator consists of the total population of the same age group, excluding those who did not answer to the question 'participation to education and training'. Both the numerator and the denominator come from the EU Labour Force Survey. The information collected relates to all education or training whether or not relevant to the respondent's current or possible future job. Source: Eurostat.

Indicator	Description and Source
Expenditures for education (investments in education and training)	Total public expenditure on education as a percentage of GDP: Generally the public sector funds the education either by bearing directly the current and capital expenses of educational institutions (direct expenditure for educational institutions) or by supporting students and their families with scholarships and public loans as well as by transferring public subsidies for educational activities to private firms or non-profit organizations (transfers to private households and firms). Both types of transaction together are reported as total public expenditure on education. Source: Eurostat.
Flexibility of wage determination	In your country, how are wages generally set? [1 = by a centralized bargaining process; 7 = by each individual company] | 2013–14 weighted average Source: Global competitiveness Report, World Economic Forum, Executive Opinion Survey.
Marginal effective tax rates on employment incomes	This indicator measures the percentage of gross earnings which is "taxed away" through higher tax and social security contributions and the withdrawal of unemployment and other benefits when an unemployed person returns to employment. This structural indicator covers single persons without children earning, when in work, 67% of the average earnings. Source: Eurostat.
Corruption Perception Index	A country/territory's score indicates the perceived level of public sector corruption on a scale of 0–100, where 0 means that a country is perceived as highly corrupt and a 100 means that a country is perceived as very clean. Source: Transparency International http://www.transparency.org/research/cpi/

The employment efficiency and income distribution index is based on a two-step procedure (Knogler and Lankes, 2015).

First, a Principal Component Analysis (PCA) is carried out on eleven original social policy indicators in order to identify the main dimensions of social models. PCA is a multivariate analysis technique that aims to evaluate how different variables are associated with each other. The variable identification issue (several indicators may proxy for the same institution or distinct variables may proxy for similar institutions) is addressed by reducing the dimensionality of the dataset. This is achieved by transforming correlated indicators into the (smallest possible) new set of variables (the principal components) using the correlation matrix. The obtained components are uncorrelated, thus measuring different 'statistical dimensions' in the dataset and addressing the problem of multicollinearity of indicators.

Second, after reducing the dimensionality of the dataset by transforming the indicators in three independent variables (components), we analyse in a second step how many components are relevant in determining labour market outcome (employment rate) and income distribution (income inequality S80/S20) in EU countries. Therefore we compute the weights for the components by a regression of the three components on the employment rate and the income inequality, respectively. In order to account for the fact, that institutions are seen to lead labour market performance, we use three-year lags of the indicators. The advantage of this procedure is that a component that is more important for employment/income inequality gets a higher weight then a component that is not important. In contrast to indices that weight variables ex ante by assigning identical or arbitrary weights, we use PCA and regression coefficients to generate an empirically derived weighting of indices.

Social policy dimensions

The PCA yields three components based on the idea that a component should at least explain the variance that is contained on average in a single indicator (table 2). Component loadings of single indicators are calculated using mean values of indicators over five years (2006–2010). This ensures that possibly existing annual effects play a minor role.

Based on the component loadings, the actual values of individual cases, that is, countries, for the factor scores are calculated. The country scores obtained along the principal components that account for most of the overall variation in the data can then be used for analysing how many factors are relevant in determining labour market outcome.

Table 2: Principal components analysis of social policy indicators

Component loadings	Component 1	Component 2	Component 3
Early leavers from education and training		–x	
Marginal effective tax rate	x		
Reduction of the at-risk-of-poverty rate by social transfers		x	
Life-long learning	x		
Hiring and Firing			x
Spending on human resources	x		
Flexibility of wage determination			x
Generosity of unemployment benefits	x		
Expenditures on active labour market policy	x		
Corruption Perception Index	x		
Years of schooling		x	

Note: x: loadings > 0.6; Principal component analysis based on correlation matrix with varimax rotation.

A first component (accounting for 46.1% of total variance) can be interpreted as *emphasis on labour market security*. This social model dimension is correlated with marginal effective tax rate, expenditures on human resources, life-long learning, generosity of unemployment benefits, expenditures on active labour market policy and the Corruption Perception Index. Active labour market policy and investment in human resources stand for activation, flexibility and mobility of employees (Flexicurity) and increase labour market and income security. In association with high unemployment benefits a high emphasis on employment security can lead to a high marginal tax rate. The higher the emphasis on labour market security the more is a country perceived as 'clean' in terms of corruption.

A second component (accounting for 21.1% of total variance) stands for the dimension of *social equality*. It correlates negatively with early school leavers and positively with the reduction of poverty through social transfers and with years of schooling.

A third component (accounting for 11.5% of total variance) depicts the dimension of *labour market flexibility*. It affects hiring and firing practises and the flexibility of wage determination.

Social Model Employment Efficiency Index (SMEE-Index)

The result of the principal component and regression analysis is one aggregate social model index. The Employment Efficiency-Index is to show, how social institutions (captured by the dimensions of social models) contribute to employment. Such the higher the value of the Index the higher is the employment rate. Therefore, the weights for the dimensions are computed with a regression of the employment rate (average over 2009–2013) on the three components. Only those dimensions with significant explanatory power ($p < 0.05$) were retained. This procedure resulted in a set of institutional dimensions that is able to explain 56.3 percent of the variation in the employment rates. As the influence of the component "Labour market flexibility" on the employment rate is not significantly different from zero, we ignore "Labour market flexibility" by computing the index.

Table 3: SMEE Index

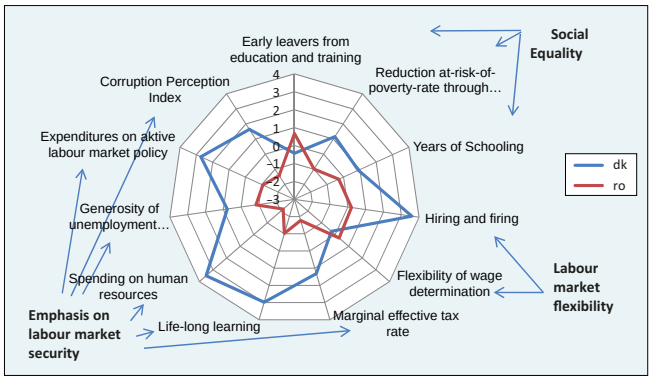
	elms	se	SMEE-Index	Ranking
dk	2.92	0.28	77.16	1
se	0.98	0.97	70.04	2
fi	1.29	0.26	69.85	3
nl	0.98	0.61	69.26	4
at	0.87	0.52	68.56	5
ie	0.54	0.72	67.51	6
be	0.89	–0.19	67.13	7
uk	0.14	0.63	65.51	8
si	0.03	0.81	65.45	9
de	0.02	0.83	65.43	10
fr	–0.08	0.13	63.49	11
cz	–0.60	1.00	63.01	12
ee	–0.42	0.46	62.70	13
hu	–0.45	0.32	62.22	14
lt	–0.76	0.81	61.92	15
lv	–0.26	–0.33	61.70	16
pl	–0.61	0.38	61.65	17
es	0.25	–1.73	60.96	18
pt	0.03	–1.87	59.67	19
sk	–1.52	1.12	59.18	20
hr	–1.38	0.69	58.90	21
it	–0.57	–1.03	58.83	22
bg	–0.95	–0.64	57.97	23
gr	–1.31	–0.42	56.82	24
ro	–1.52	–0.30	56.14	25

Table 3 shows the country scores of the two components Emphasis on labour market security (elms) and Social equality (se) (column 2 and 3). Column 4 of table 4 displays the SMEE-Index.

The Ranking (column 5 of table 4) shows Denmark on first position, which has the highest score in emphasis on labour market security (elms). The first places in the ranking are dominated by countries with high elms but differently marked social equality. Slovenia, by far the new member country with the highest SMEE index score, is in this leading group as well. The Index shows, that different combinations of emphasis on labour market security and social equality can result in good labour market outcomes in terms of employment rate.

Figure 3 compares the best performer Denmark with the lowest ranked country Romania. Characteristic for high-ranking countries like Denmark is a high emphasis on labour market security as witnessed by the important role of active labour market policy, a high level of spending on human resources and of lifelong learning and low corruption.

Figure 3: Employment Efficiency Index: Best vs. worst performer



Note: Standardized values.

Social Model Income Distribution Index (SMID-Index)

The Income Distribution Index shows, how labour market and social institutions contribute to income inequality as measured by S80/S20 income quintile ratio. Such the higher the value of the Index the higher is the S80/S20 ratio. Therefore we compute the weights for the components with a regression of the S80/S20 (average over 2006–2010) on the three components. As with the Employment Efficiency Index, only those components with significant explanatory power were retained. The outcome is that all three components are significant and explain 67.3 percent of the variation in the S80/S20 ratio.

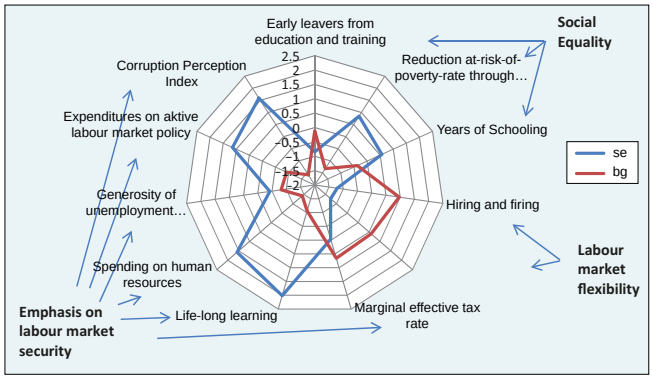
Table 4 shows the country scores of the components (column 2, 3, 4). Column 5 of table 4 displays the SMID-Index which is calculated according to the formula above. The ranking (column 6 of table 4) shows Sweden on first position, which has the lowest score in income inequality. The first ten places in the ranking are exclusively dominated by countries with relatively high ELMS and simultaneously high social equality except for Belgium. Slovenia, by far the new member country with the lowest SMID Index, is in this leading group as well. The Index shows, that different combinations of emphasis on labour market security, social equality and labour market flexibility can result in low inequality of income distribution.

Table 4: SMID Index

	elms	se	lmf	SMID-Index	Ranking
se	0.98	0.97	–0.99	3.29	1
nl	0.98	0.61	–0.95	3.58	2
at	0.87	0.52	–0.99	3.69	3
de	0.02	0.83	–1.24	3.74	4
si	0.03	0.81	–0.92	3.86	5
ie	0.54	0.72	–0.14	3.98	6
fi	1.29	0.26	0.02	4.06	7
dk	2.92	0.28	2.71	4.28	8
be	0.89	–0.19	–0.81	4.28	9
cz	–0.60	1.00	0.11	4.36	10
sk	–1.52	1.12	–0.26	4.54	11
fr	–0.08	0.13	–0.40	4.62	12
lt	–0.76	0.81	0.54	4.73	13
uk	0.14	0.63	1.36	4.77	14
hr	–1.38	0.69	–0.14	4.85	15
pl	–0.61	0.38	0.34	4.92	16
hu	–0.45	0.32	0.83	5.07	17
ee	–0.42	0.46	1.53	5.20	18
gr	–1.31	–0.42	–0.94	5.39	19
it	–0.57	–1.03	–0.83	5.57	20
lv	–0.26	–0.33	1.22	5.63	21
ro	–1.52	–0.30	–0.01	5.73	22
es	0.25	–1.73	–0.71	5.79	23
pt	0.03	–1.87	–0.63	6.02	24
bg	–0.95	–0.64	0.91	6.06	25

Figure 4 compares the best performer Sweden with the lowest ranked country Bulgaria. High levels of expenditures on human resources and of lifelong learning, low corruption, a high poverty reduction through social transfers and a relatively rigid labour market regulation make the difference.

Figure 4: Income Distribution Index: Best vs. worst performer



Note: Standardized values.

Conclusions

Based on socio-economic indicators reflecting the main tasks of social models, a set of institutional variables that are weighted and combined into two indices of institutional quality for European Union Member countries is identified. We show that the *Index of Employment Efficiency* is able to explain the impact of institutional characteristics of European social models on employment rates; the *Index of Income Distribution* explains the impact of different institutional combinations on the inequality of income distribution. Both indices can be used to analyse and understand the differences in employment performance and income distribution across European Member countries.

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Published by the Institute for East and Southeast European Studies IOS

Managing editor: Dr. Manuela Troschke
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